

CLAIMS

We claim:

1. A multilayer composite article comprising:
a gel coat layer comprising a thermosetting resin;
a fiber reinforced laminate layer comprising first fibers having a first length;
and
a barrier layer disposed between the gel coat layer and the laminate layer;
wherein the barrier layer comprises second fibers dispersed in a polyester resin, said
second fibers having a second length shorter than the first length.
2. A multilayer composite according to claim 1, wherein the polyester resin
comprises up to 25% of an isophthalic acid resin, based on the total weight of the
polyester resin.
3. A multilayer composite according to claim 1, wherein the polyester resin
comprises 75-100% by weight of a dicyclopentadiene resin, based on the total weight of
the polyester resin.
4. A multilayer composite according to claim 1, wherein the polyester resin
comprises 75-99% by weight dicyclopentadiene resin and 1-25% by weight isophthalic
resin.
5. A multilayer composite according to claim 1, wherein the second length is
1 mm or less.
6. A multilayer composite according to claim 1, wherein the second length is
0.5 mm or less.
7. A multilayer composite according to claim 1, wherein the second length is
0.4 mm or less.

8. A multilayer composite according to claim 1, wherein the gel coat is 1/2-2 mm thick, the barrier coat is 1-3 mm thick, and the laminate layer is 2-5 mm thick.

9. A multilayer composite according to claim 1, wherein the barrier coat comprises up to 45% by weight milled glass fibers of length less than 1 mm and 50-95% by weight resin comprising dicyclopentadiene resin and isophthalic acid ratio in a ratio of at least 4:1.

10. A multilayer composite according to claim 1, wherein the barrier coat further comprises polymeric hollow microspheres.

11. An automotive body panel comprising:
a gel coat layer;
a laminate layer; and
a barrier coat disposed between the gel coat and the laminate layer,
wherein the barrier coat comprises a polyester resin and reinforcing fibers of length 1mm or less.

12. A body panel according to claim 11, wherein the barrier coat exhibits an elongation at break of at least 1%.

13. A body panel according to claim 11, wherein the barrier coat exhibits an elongation at break of at least 2%.

14. A body panel according to claim 11, wherein the barrier coat comprises dicyclopentadiene resin and isophthalic resin in a ratio of 4:1 and higher.

15. A body panel according to claim 11, wherein the laminate layer comprises a dicyclopentadiene resin and glass fibers of 6mm in length or greater.

16. A body panel according to claim 15, wherein the laminate further comprises hollow polymeric microspheres.
17. A body panel according to claim 11, wherein the laminate layer, the barrier coat, or both further comprise a pigment.
18. A body panel according to claim 17, wherein the pigment comprises carbon black.
19. A body panel according to claim 11, wherein the barrier coat comprises reinforcing glass fibers of length 0.5 mm or less.
20. A barrier coat composition comprising:
 - a resin component comprising:
 - 80-100 parts of dicyclopentadiene resin and up to 20 parts of an isophthalic acid resin, and
 - a reinforcing fiber component comprising fibers having a length of 1mm or less.
21. A composition according to claim 20, wherein the reinforcing fiber component comprises fibers having a length of 0.5 mm or less.
22. A composition according to claim 20, wherein the fibers have a length of about 0.4 mm.
23. A composition according to claim 20, wherein the fibers have a length of about 0.025 mm.
24. A composition according to claim 20, wherein the composition exhibits an elongation at break of 1% or greater.

25. A composition according to claim 20, wherein the composition exhibits an elongation at break of 2% or greater.

26. A composition according to claim 20, wherein the barrier coat further comprises a filler selected from the group consisting of hollow glass microspheres and polymeric hollow microspheres.

27. A composition according to claim 20, wherein the resin comprises up to 40% by weight styrene monomer.

30. A method for preparing a composite article by spray up operation, comprising the steps of:

applying a gel coat into a mold;

applying a barrier coat over the gel coat in the mold; and

applying a laminate formula over the barrier coat, wherein the laminate formula contains 20-60% by weight of first reinforcing fibers having a first length of 6 mm or greater and 40-80% by weight of a paste comprising a laminate coat polyester resin;

wherein the barrier coat comprises second fibers having a length less than the first length dispersed in a barrier coat polyester resin.

31. A method according to claim 30, wherein the gel coat applied to a thickness of 0.2 to 2 mm, the barrier coat is applied to a thickness of 0.5 to 5 mm, and the laminate layer is applied to a thickness of 1-10 mm.

32. A method according to claim 30, wherein the thickness of the composite article is from 2 to 15 mm.

33. A method according to claim 30, wherein the composite article is an automotive body panel.

34. A method according to claim 30, wherein the laminate formula fiber comprises polymeric hollow microspheres.
35. A method according to claim 30, wherein the first reinforcing fiber comprise glass fibers of 12 mm or greater in length or a second fibers comprise glass fibers of 1 mm or less in length.
36. A method according to claim 30, wherein the barrier coat polyester resin comprises 75-100 parts of a dicyclopentadiene resin and 1-25 parts of an isophthalic acid resin.
37. A method of producing an automotive body panel comprising the steps of:
applying a gel coat composition to mold surface;
applying a barrier coat composition to the gel coat in the mold;
applying a fiber reinforced laminate composition comprising fibers having a first length onto the barrier coat and the mold;
curing at 50°C or less; and
removing the cured article from the mold,
- wherein the barrier coat comprises polyester resin and glass fibers having a second length shorter than the first length.
38. A method according to claim 37, wherein the gel coat comprises a thermosetting resin.
39. A method according to claim 37, wherein the barrier coat exhibits elongation at break of 1% or greater.
40. A method according to claim 37, wherein the barrier coat exhibits elongation at break of 2% or greater.

41. A method according to claim 37, wherein the barrier coat comprises 100 parts of a polyester, including up to 20 parts of an isophthalic acid polyester resin.
42. A method according to claim 41, wherein the barrier coat comprises a dicyclopentadiene resin.
43. A method according to claim 42, wherein the barrier coat comprises glass fibers having a length of 1 mm or less.
44. A method according to claim 37, wherein the barrier coat comprises glass fibers having a length of 0.5 mm or less.
45. A method according to claim 37, comprising the steps of applying the gel coat to a thickness of 0.5-2 mm, applying the barrier coat to a thickness of 1-3 mm, and applying the laminate coat to a thickness of 2-5 mm.